



**Remedial Investigation Field Program  
Technical Memorandum**

**Remedial Investigation/Feasibility Study  
West County Road 112 Ground Water Plume Site  
Midland, Midland County, Texas**

**Remedial Action Contract 2 Full Service  
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## CONTENTS

	<u>Page</u>
1. INTRODUCTION .....	1
1.1 REMEDIAL INVESTIGATION PHASES COMPLETED TO DATE .....	1
1.2 DATA GAPS .....	2
1.3 ELEMENTS OF THIS PERIOD OF THE RI FIELD PROGRAM.....	2
1.4 DOCUMENT ORGANIZATION.....	3
2. FIELD PROGRAM SAMPLING ACTIVITIES .....	3
2.1 NEW MONITORING WELL INSTALLATION.....	3
2.2 GEOPHYSICAL LOGGING.....	4
2.3 TAP WATER SAMPLING.....	4
2.4 MONITORING WELL GROUND WATER SAMPLING .....	4
3. PROPOSED FIELD SCHEDULE.....	6

## LIST OF FIGURES

<u>Number</u>	<u>Title</u>
1	Site Layout
2	Proposed Additional Monitoring Wells Location Map

## LIST OF REVISED SAP TABLES

<u>Number</u>	<u>Title</u>
3	Quality Assurance Indicator Criteria
5	Required Volume, Containers, Preservatives, and Holding Times
6	Frequency of Field Quality Control Samples

## **LIST OF ACRONYMS AND ABBREVIATIONS**

EA	EA Engineering, Science, and Technology, Inc.
EPA	U.S. Environmental Protection Agency
GPS	Global Positioning System
IDW	investigation-derived waste
MCL	Maximum Contaminant Level
QC	quality control
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
TAL	Target Analyte List
TCEQ	Texas Commission on Environmental Quality
TCL	Target Compound List
TOC	top-of-casing
USGS	U.S. Geological Survey
VOC	volatile organic compound
WCR	West County Road

## 1. INTRODUCTION

This technical memorandum details the next phase of the Remedial Investigation (RI) field program for the West County Road (WCR) 112 Ground Water Plume Site (site) located in Midland, Midland County, Texas. This document will continue to be updated for each investigative phase of the RI by the U.S. Environmental Protection Agency (EPA) and EA Engineering, Science, and Technology, Inc. (EA) using data obtained from each prior phase of the RI. This document provides details specific to this phase of the RI field program, such as sample types, estimated sample quantities, sample locations, sample collection methods, field procedures for borehole drilling and well installation, and the RI field schedule. The Quality Assurance Project Plan and Field Sampling Plan are incorporated into the main body of the EPA-approved Sampling and Analysis Plan (SAP), dated 27 October 2010 (EA 2010b).

### 1.1 REMEDIAL INVESTIGATION PHASES COMPLETED TO DATE

- ***Phase 1 Hydrogeological Assessment – November 2011***

The Phase 1 Hydrogeological Assessment includes geophysical logging of existing private water wells and possible deployment of water-level data-logging probes in existing private water wells. During November 2010, EPA coordinated with the U.S. Geological Survey (USGS) to perform gamma and resistivity geophysical logging of 17 existing monitoring wells in the vicinity of the site. The USGS logged Schlumberger Technology Corporation monitoring wells MW-09, MW-22/22A/22B, MW-23/23A/23B, MW-26/26A/26B, MW-27/27A/ 27B, MW-28/28A/28B, and MW-29 (see Figure 2 for well locations). The deployment of water-level data logging probes was deferred until a later phase of the RI field program.

- ***Phase 1 Environmental Sampling – November and December 2010***

From 29 November through 3 December 2010, EA collected tap water samples from 106 private water supply wells for analysis for total metals and hexavalent chromium. Private water supply wells along the chromium plume perimeter (chromium below the EPA National Primary Drinking Water Regulation Maximum Contaminant Level [MCL; EPA 2011a]) were sampled for total chromium analysis to evaluate the need for filtration systems. In addition, EA collected tap water samples from a subset of private water supply wells located within the plume and along the plume perimeter for hexavalent chromium analysis in order to develop a correlation between total and hexavalent chromium.

- ***Phase 2 Environmental Sampling – April, May, and June 2011***

From 11–14 April 2011, EA collected pre-filtration tap water samples from 106 private water supply wells for analysis for total metals and hexavalent chromium. Private water supply wells along the chromium plume perimeter (chromium below the MCL [EPA 2011a]) were sampled for total chromium analysis to evaluate the need for filtration systems. In addition, EA collected tap water samples from a subset of private water

supply wells located within the plume and along the plume perimeter for hexavalent chromium analysis in order to develop a correlation between total and hexavalent chromium.

From 16–20 May 2011, in conjunction with Texas Commission on Environmental Quality (TCEQ)'s post-filtration tap water sampling event, EA collected (1) pre-filtration tap water samples from 43 private water supply wells with TCEQ filtration systems in place; and (2) tap water samples from four newly-identified perimeter private water supply wells without filtration systems in place. Tap water samples were submitted for analysis for total metals and hexavalent chromium.

From 20–23 June 2011, EA collected ground water samples from 42 newly-installed monitoring wells (see Phase 2 Hydrogeological Assessment below) and 16 existing monitoring wells using trailer-based low-flow (micro-purge) sampling methodology for total metals analysis.

- ***Phase 2 Hydrogeological Assessment – May and June 2011***

From 9 May through 3 June 2011, EA and Peterson Drilling & Testing Services, Inc. drilled, geophysical logged, and installed 21 dual-completion (nested) ground water monitoring wells (total of 42 monitoring points) (Figure 2).

## **1.2 DATA GAPS**

Further field investigation will be conducted in an attempt to eliminate data gaps. Data gaps include:

- The extent of chromium impacted ground water is not fully defined to the northeast of I-20.
- The extent of volatile organic compound (VOC)-impacted ground water is not defined at the WCR 112 site.
- The nature and extent of impacted soil is not defined with regards to any of the chemicals of potential concern.

## **1.3 ELEMENTS OF THIS PERIOD OF THE RI FIELD PROGRAM**

The next phase of the RI field program for the WCR 112 site will include the following elements:

- ***Hydrogeological Assessment Phase 3***

New monitoring well installation, geophysical logging of open boreholes, and well development

- ***Environmental Sampling Phase 3***

Tap water sampling of private water wells and ground water sampling of new and existing monitoring wells

## **1.4 DOCUMENT ORGANIZATION**

Following this introduction, Section 2 describes the tasks to be accomplished during the upcoming phase of the RI field program. Section 3 presents the updated RI field schedule.

## **2. FIELD PROGRAM SAMPLING ACTIVITIES**

Except as outlined below, all aspects of sample collection, the analytical program, sample handling, as well as handling quality control (QC) requirements, and data assessment are outlined in the EPA-approved SAP (EA 2010b). Field activities will be performed in accordance with the SAP and the Health and Safety Plan, dated 8 October 2010 (EA 2010a), as well as the *Contract Laboratory Program Guidance for Field Samplers* (EPA 2011b). Figure 2 presents the sample locations and proposed monitoring well locations for the next phase of RI field activities. Quality assurance and QC samples will be collected in accordance with protocols established in the SAP. Investigation-derived waste (IDW) will be characterized and disposed of in the manner outlined in the SAP.

The following SAP tables, which follow the body of this memorandum, were updated to reflect analysis for Target Compound List (TCL) VOCs in ground water, as well as IDW characterization:

- Table 3, Quality Assurance Indicator Criteria, presents the acceptance criteria for definitive onsite and offsite laboratory data for chemical analyses of investigation samples only.
- Table 5, Required Volume, Containers, Preservatives, and Holding Times, specifies the required sample volume, container type, preservation technique, and holding time for each analysis that is to be conducted during each phase of sampling. Analyses for the IDW profiling will be conducted according to the specifications in the selected analytical methods listed in Table 5.
- Table 6, Frequency of Field Quality Control Samples, presents the frequency of QC samples to be collected at the site.

### **2.1 NEW MONITORING WELL INSTALLATION**

EA will install new monitoring wells at up to six locations to provide additional information regarding the horizontal and vertical distribution of chromium in ground water at the WCR 112 site. Monitoring wells will be constructed using multiple (nested) completions at each location, with screened intervals based on interpretation of geophysical logs collected from open boreholes. EA will be responsible for obtaining right-of-way access from the Texas Department

of Transportation and coordinating subsurface utility location with the Texas Excavation Safety System.

Monitoring wells WMW-27, WMW-29, WMW-31, WMW-32, WMW-33, and WMW-34 will be drilled in the approximate locations indicated on Figure 2. Locations may be revised in the field upon consultation with, and approval from, EPA. EA proposes to install up to six nested ground water monitoring wells (total of 12 monitoring points) addressing Ogallala and Edwards-Trinity water-bearing zones north of U.S. Interstate Highway 20.

EA will survey the locations and top-of-casing (TOC) elevations for all newly-installed monitoring wells using portable Global Positioning System (GPS) equipment. Elevations for each well TOC will be measured and referenced to a relative benchmark. As an alternative, EA may subcontract a local State of Texas-Registered Professional Licensed Surveyor to perform survey activities.

## **2.2 GEOPHYSICAL LOGGING**

Geophysical logging will be conducted on open boreholes prior to the completion of newly-installed monitoring wells to obtain a better understanding of geologic conditions. In addition, existing monitoring and public water supply wells will be geophysically logged, pending owner access and EPA technical direction. Open boreholes and existing wells will be logged using gamma and resistivity logging instruments. Depending on availability, EPA will coordinate with the USGS to perform geophysical logging activities. As a contingency measure, EA has subcontracted a geophysical logging firm to support the investigation in the case where the USGS is unavailable.

EA will survey the locations and TOC elevations for those existing wells undergoing geophysical logging using portable GPS equipment. Elevations for each well TOC will be measured and referenced to a relative benchmark. As an alternative, EA may subcontract a local State of Texas-Registered Professional Licensed Surveyor to perform survey activities.

## **2.3 TAP WATER SAMPLING**

EA will collect tap water samples from up to 120 existing private water supply wells for analysis. EA will coordinate with EPA prior to each mobilization to identify which wells are to be sampled and to ensure that the necessary access agreements are in place. Samples will be analyzed for Target Analyte List (TAL) metals, a subset of which may also be analyzed for hexavalent chromium.

In the case of an existing water supply well with an existing non-functioning pump in place, EA may collect a ground water sample using snap samplers or low-flow sampling methodology (submersible pump). A well pump service will be subcontracted to pull and reset the existing non-functioning or missing pump.

## **2.4 MONITORING WELL GROUND WATER SAMPLING**

Following well development, ground water samples will be collected from existing and newly-installed monitoring wells using snap samplers or low-flow sampling methodology. The number

of snap samplers deployed along screened intervals will be determined following geophysical logging of the existing and new wells. The snap samplers will remain in the wells long enough for the well water, contaminant distribution, and flow dynamics to re-stabilize following sampler deployment. Ground water samples will be analyzed for TAL metals, a subset of which may also be analyzed for hexavalent chromium and TCL VOCs. EA will coordinate with EPA prior to each mobilization to identify which wells are to be sampled and to ensure that the necessary access agreements are in place.

## 2.5 SAMPLE DESIGNATION

Sampling designations associated with monitoring wells have been revised. Each sampling location will be designated with a unique alphanumeric designation according to the following sample classifications:

- **New Monitoring Well Designation**—Newly-constructed monitoring well designation will include two fields that are separated by a dash; for example: WMW-27A.
  - The first alpha character in the first field, "W," identifies the EPA site (WCR 112); this will avoid any confusion with existing non-EPA monitoring wells.
  - The second and third alpha characters in the first field, "MW," identify the well as a permanent monitoring well.
  - The first two characters of the second field, "27," represent the monitoring well number designation or identifier.
  - The third character of the second field, "A," represents the water-bearing zone in which the well is screened, where:
    - A = shallow water-bearing zone (Ogallala)
    - B = deep water-bearing zone (Edwards-Trinity/Antler Sand)
  - A fourth numeric character may be added to the second field, "1" or "2," to differentiate between the upper and lower segments of each water-bearing zone, where:
    - A1 = upper shallow water-bearing zone (screened in upper Ogallala)
    - A2 = lower shallow water-bearing zone (screened in lower Ogallala)
    - B1 = upper deep water-bearing zone (screened in upper Edwards-Trinity/Antler Sand)
    - B2 = lower deep water-bearing zone (screened in lower Edwards-Trinity/Antler Sand).
- **Existing Monitoring Well Designation**—Existing monitoring well designation will include two fields that are separated by a dash; for example: SMW-22.
  - The first alpha character in the first field, "S," identifies the owner of the existing monitoring well, where:
    - S = Schlumberger Technology Corporation
    - L = Lear Corporation
  - The second and third alpha characters in the first field, "MW," identify the well as a permanent monitoring well.
  - The first two characters of the second field, "22," represent the monitoring well number designation or identifier.



- **Monitoring Well Ground Water Sample Designation**—Ground water sample designation for monitoring wells will also utilize will include two fields that are separated by a dash; for example: WMW-27A or SMW-22.

### 3. PROPOSED FIELD SCHEDULE

The following schedule will be followed for the upcoming phase of the RI sampling program. Field changes to schedule may be required due to adverse weather conditions or site access issues. EPA will be notified of conditions which may impact the field work schedule.

#### **RI Task (Phase 3)**

#### **Schedule**

Utility location/property access	October 2011
Install and develop new monitoring wells	Late October to early November 2011
Geophysically log new monitoring wells	Late October to early November 2011
Tap water sampling	December 2011
Monitoring well sampling	December 2011.

## REFERENCES

- EA Engineering, Science, and Technology, Inc. (EA). 2010a. Health and Safety Plan, West County Road 112 Ground Water Plume Superfund Site, Midland, Midland County, Texas. 8 October.
- EA. 2010b. Sampling and Analysis Plan, West County Road 112 Ground Water Plume Site, Midland, Midland County, Texas. 27 October.
- EA. 2011. Conceptual Understanding of the Site Technical Memorandum, Revision 01, West County Road 112 Ground Water Plume Site, Midland, Midland County, Texas. 6 October.
- U.S. Environmental Protection Agency (EPA). 2007. *Multi-Media, Multi-Concentration, Organic Analytical Service for Superfund (SOM01.2)*. EPA/540-FS-07-001. Office of Solid Waste and Emergency Response. August.
- EPA. 2010. *USEPA Contract Laboratory Program Statement of Work for Inorganic Superfund Methods ISM01.2*. January.
- EPA. 2011a. Drinking Water Contaminants, National Primary Drinking Water Regulations. Updated 11 January.
- EPA. 2011b. *Contract Laboratory Program Guidance for Field Samplers*. Final. EPA 540-R-09-03. Office of Superfund Remediation and Technology Innovation. Washington, D.C. January.

## **Revised Sampling and Analysis Plan Tables**

**TABLE 3**

**QUALITY ASSURANCE INDICATOR CRITERIA**

**WEST COUNTY ROAD 112 GROUND WATER PLUME SITE**

Indicator Parameter	Analytical Parameter	QC Sample	Acceptance Criteria for Laboratory Analysis
Accuracy (percent recovery)	TCL VOCs	MS, MSD Blanks	50 to 150 percent recovery Less than CRQL
	TAL Metals Hexavalent chromium	MS	75 to 125 percent recovery
		LCS	80 to 120 percent recovery
		Blanks <sup>1</sup>	Less than CRDL
Precision (RPD)	TCL VOCs	MS, MSD Field duplicates	30 percent RPD 50 percent RPD
	TAL Metals Hexavalent chromium	MS, MD	20 percent RPD (aqueous) 35 percent RPD (solid)
		Field duplicates	50 percent RPD
Sensitivity (quantitation limits)	Analytical tests	MS, MD, MSD	Not applicable
		Field duplicates	
Completeness	The objective for data completeness is 90 percent.		
Representativeness	The sampling network analytical methods for this site are designed to provide data that are representative of site conditions.		
Comparability	The use of standard published sampling and analytical methods, and the use of QC samples, will ensure data of known quality. These data can be compared to other data of known quality.		
Notes: <sup>1</sup> May include method blanks, reagent blanks, instrument blanks, calibration blanks, and other blanks collected in the field (such as field blanks) CRDL = Contract-required Detection Limit CRQL = Contract-required Quantitation Limit LCS = laboratory control sample MD = matrix duplicate MS = matrix spike MSD = matrix spike duplicate QC = quality control RPD = relative percent difference TAL = Target Analyte List TCL = Target Compound List VOC = volatile organic compound			

**TABLE 5**

**REQUIRED VOLUME, CONTAINERS, PRESERVATIVES, AND HOLDING TIMES  
WEST COUNTY ROAD 112 GROUND WATER PLUME SITE**

Parameter	Method	Volume and Container	Preservatives	Holding Time <sup>1</sup>
<b>Ground Water Samples</b>				
TAL metals	CLP ISM01.2 <sup>2</sup>	One 1-liter narrow-mouth HDPE bottle	Nitric acid to pH < 2 Store at 4±2°C	180 days to analysis
Hexavalent chromium	EPA SW-846 7199 <sup>3</sup> or equivalent	One 125-milliliter narrow-mouth HDPE bottle	Store at 4±2°C	24 hours to analysis
TCL VOCs	CLP SOM01.2 <sup>4</sup>	Three 40- milliliter glass vials with Teflon™-lined cap	HCl to pH < 2; Store at 4±2°C	14 days
<b>Soil Samples</b>				
TAL metals	CLP ISM01.2 <sup>2</sup>	One 8-ounce glass jar with Teflon™-lined cap	Store at 4±2°C	180 days to analysis
Hexavalent chromium	EPA SW-846 7196 <sup>3</sup> or equivalent	One 8-ounce glass jar with Teflon™-lined cap	Store at 4±2°C	30 days to extraction ; 7 days to analysis
<b>IDW Soil and Water Samples</b>				
Reactivity, corrosivity, and ignitibility	SW-846 9045C, 1030, and Chapter 7 <sup>3</sup>	One 8- ounce glass jar with Teflon™-lined cap	Store at 4±2°C	NA/72 hours
TCLP VOCs and metals	SW-846 1311 <sup>3</sup>	One 8- ounce glass jar with Teflon™-lined cap	Store at 4±2°C	14 days
Notes: <sup>1</sup> Holding time is shown as the time from sample collection to the time of sample extraction/time from sample extraction to analysis (as appropriate). <sup>2</sup> EPA 2010 <sup>3</sup> EPA 1996 <sup>4</sup> EPA 2007 CLP = Contract Laboratory Program EPA = U.S. Environmental Protection Agency HCl = hydrochloric acid HDPE = high-density polyethylene TAL = Target Analyte List TCL = Target Compound List TCLP = Toxicity Characteristic Leaching Procedure VOC = volatile organic compound				

**TABLE 6**

**FREQUENCY OF FIELD QUALITY CONTROL SAMPLES**

**WEST COUNTY ROAD 112 GROUND WATER PLUME SITE**

Field QC Sample	Frequency <sup>1</sup>
Trip blank	1 per cooler containing aqueous samples for VOC analysis
Field blank	1 per day, if site conditions render this sample necessary
Field duplicate	1 per 10 samples
Equipment rinsate blank	1 per non-dedicated equipment type per day or 1 per 20 samples
MS/MD <sup>2</sup> (inorganics)	1 per 20 samples (or per EPA Region 6 Laboratory requirements)
MS/MSD <sup>2</sup> (organics)	1 per 20 samples (or per EPA Region 6 Laboratory requirements)
Temperature blank	1 per cooler
Notes: <sup>1</sup> The QC sample collection frequency applies to samples collected for fixed-laboratory analysis (EPA 1996; 2007; 2010a). <sup>2</sup> MS, MSD, and MD analyses are technically not field QC samples; however, they generally require that the field personnel collect additional volumes of samples and are, therefore, included on this table for easy reference.	

## Figures





**Legend:**

- Business of Concern
- Site Area



Image Source: Texas Orthoimagery Program, 2009.



Remedial Investigation/Feasibility Study  
 West County Road 112 Ground Water Plume Site  
 Midland County, Texas

Figure 1  
 Site Layout



